

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket (No.)	81230.058002
First Inventor: Darbee, et al.	
Title	Key Mover
Express Mail Label No.	E J118553815US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 17]
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R&D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 133) [Total Sheets 7]
4. Oath or Declaration [Total Pages 3]
 - a. ☐ Newly executed (original or copy)
 - b. ☒ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28)

Assistant Commissioner for Patents
ADDRESS TO: Box Patent Application
Washington, DC 20231

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney
9. ☐ English translation Document (if applicable)
10. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☒ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
13. ☐ *Small Entity Statements ☒ Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☒ Other: Check in the amount of \$ 458.00

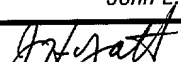
- 16.
- ☒
- If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 07/990,854Prior application information: Examiner Edwards Group/Art Unit: 2735

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS☐ Customer Number or Bar Code Label (Insert Customer No or Attach bar code label here) or ☒ Correspondence address below.

Name	Mark R. Galis				
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Country	U.S.A.	Telephone	312-715-4000	Fax	3127154800

Name (Print/Type)	John E. Hyatt	Registration No.	43,421
Signature		Date:	9/29/99

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Darbee, et al.)	
)	
Serial No.:	Not Yet Assigned)	
)	
Filed:	Herewith)	Examiner: Not Yet Assigned
)	
Title:	Key Mover)	
)	Group Art Unit: 2735
)	
Docket No.:	81230.058002)	

TRANSMITTAL SHEET

BOX PATENT APPLICATION
 Assistant Commissioner for Patents
 Washington, D.C. 20231

Dear Sir:

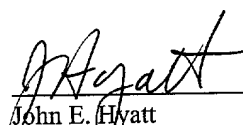
We are transmitting herewith the following:

- 1) This Transmittal Sheet;
- 2) Fee Transmittal in duplicate; and
- 3) Utility Patent Application Transmittal Sheet and elements and parts listed therein

Please charge any additional fees or credit overpayment to Deposit Account No. 011-156.

Respectfully submitted,

By:


 John E. Hyatt
 Reg. No. 43,421

ALTHEIMER & GRAY

10 South Wacker Drive, Suite 4000
 Chicago, Illinois 60606

Certificate Under 37 C.F.R. 1.10: The undersigned hereby certifies that this Transmittal Sheet and enclosures, as described hereinabove, is being deposited with the United States Postal Service as "Express Mail to Addressee" in an envelope addressed to Assistant Commissioner of Patents, BOX PATENT APPLICATION, Washington, D.C. 20231, on this 29 day of September 1999.

By:


 Name: John E. Hyatt

LABEL NO.: E J118553815US

Applicant or Patentee: Paul V. Darbee et al. Attorney's
 Serial or Patent No.: 07/990,854 Docket No.: 92032
 Filed or Issued: December 11, 1992
 For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
 STATUS (37 CFR 1.9 (f) and 1.27 (c)) INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:
KEY MOVER

☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☐ no such person, concern or organization
☒ persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

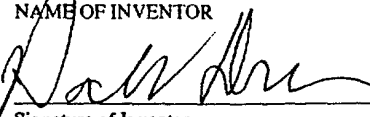
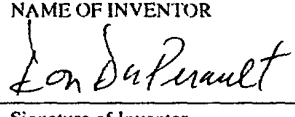
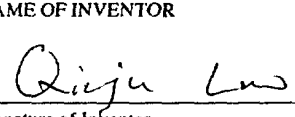
FULL NAME Universal Electronics Inc.
 ADDRESS 1920 Enterprise Parkway, Twinsburg, OH 44087
☐ INDIVIDUAL ☒ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

<u>Paul V. Darbee</u>	<u>Don G. DuPerault</u>	<u>Quiju Luo QIUJU LUO</u>
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
		
Signature of Inventor	Signature of Inventor	Signature of Inventor
<u>1-18-93</u>	<u>1-18-93</u>	<u>1-18-93</u>
Date	Date	Date

Applicant or Patentee: Paul V. Darbee et al. Attorney's
 Serial or Patent No.: 07/990,854 Docket No.: 92032
 Filed or Issued: December 11, 1992
 For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
 STATUS (37 CFR 1.9 (f) and 1.27 (c)) INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:

KEY MOVER

- ☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☐ no such person, concern or organization
☒ persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

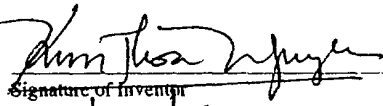
FULL NAME Universal Electronics Inc.
 ADDRESS 1920 Enterprise Parkway, Twinsburg, OH 44087
☐ INDIVIDUAL ☒ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Kimthoa Nguyen
 NAME OF INVENTOR NAME OF INVENTOR NAME OF INVENTOR

 Signature of Inventor Signature of Inventor Signature of Inventor
01/18/93
 Date Date Date

Applicant or Patentee: Paul V. Darbee et al. Attorney's
Serial or Patent No.: 07/990,854 Docket No.: 92032
Filed or Issued: December 11, 1992
For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9 (f) and 1.27 (c)) SMALL BUSINESS CONCERN

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Universal Electronics Inc.
ADDRESS OF CONCERN 1920 Enterprise Parkway
Twinsburg, OH 44087

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9 (d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled KEY MOVER

(by inventor(s))

described in

- ☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

NAME _____

ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

NAME _____

ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that a. statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Thomas C. Tyler
TITLE OF PERSON OTHER THAN OWNER President
ADDRESS OF PERSON SIGNING 1920 Enterprise Parkway
Twinsburg, OH 44087

SIGNATURE [Signature]

DATE 11/13/92

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Darbee et al.)	
)	Examiner: UNKNOWN
Application No.:	UNKNOWN)	
)	
Filing Date:	Contemporaneously Herewith)	Group Art Unit: 2735
)	
Title:	Key Mover)	
)	
Attorney Docket No.:	81230.058002 US)	
)	
Assignee:	Universal Electronics, Inc.)	

PRELIMINARY REPLY

Assistant Commissioner of Patents
BOX PATENT APPLICATION
Washington, D.C. 20231

Dear Sir:

This is a Preliminary Reply to the continuation application filed herewith.

I. REMARKS

A. Claim Status

The parent application, Ser. No. 07/990,854, was filed with 11 claims; claims 12-19 were added during prosecution. Claims 1, 2, 6, and 11 were finally rejected; claims 3-5, 7-10, and 12-19 were allowed. The instant application is a continuation of the parent application and includes claims 1, 2, 6, and 11 of the parent application designated as claims 6, 7, 8, and 9, respectfully. Consideration of the instant application in light of the arguments submitted herein is respectfully

requested.

B. Claim Rejections - 35 U.S.C. § 102

Claims 6, 7, 8, and 9 (claims 1, 2, 6, and 11 of the parent application Ser. No. 07/990,854) were rejected under 35 U.S.C. §102 over Evans et al.

Applicant respectfully submits that the instant invention is not anticipated, nor obvious, over *Evans et al.* In paper 20 of the parent application history, the Examiner correctly points out that *Evans* does not recite “reassignment means” for reassigning instructions stored in memory. The Examiner also correctly notes that *Evans* teaches command functions associated with keys; further a sequence of commands may be executed by executing a sequence key, wherein the sequence of commands are programmed to the sequence key. The Examiner asserts that this sequence key “suggests” that *Evans* has a “means to reassign a different function to any key.” Applicant respectfully submits that the Examiner is mistaken on this later point.

Evans teaches use of a “preset key” sequence to execute a lengthy key sequence with fewer keystrokes. *Evans* teaches that the “user has complete discretion in determining the function to be performed by each key.” *Evans*, Col. 7, lines 40-42. However, *Evan*’s “complete discretion” is accomplished via a delete-re-entry process, rather than a reassignment means. *Evans* teaches that

[i]f at any time while entering codes for a device into [the remote] controller, the [Evan’s] user decides that he wishes to use a different key for the particular function than the key he has previously designated for such function, he may operate [the] delete key followed by the key for such function. This will cause the entry in RAM for such function to be deleted.

Evans, Col. 7, lines 50-57. (Emphasis added.) *Evans* then requires that the function "be re-entered in the system in the manner [discussed in *Evans*] and stored in conjunction with the new key." *Evans*, Col. 7, lines 58-60. *Evans* therefore teaches a "re-entry assignment" means. To assign data to a new key, the data must be entered into the remote control (i.e. from outside the remote control memory). Applicant's invention allows data already stored in memory to be reassigned to a new key (or assigned to a key if it was not already). This ability to "reassign" data is accomplished via elements which may be conveniently referred to as "reassignment means."

II. CONCLUSION

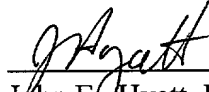
Applicant respectfully submits that the claims of instant application are patentable over the prior art of record. Further, a determination should not be influenced by an earlier conclusion. See *In re Eli Lilly & Co.*, 902 F.2d 943, 945, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990); *Piasecki*, 745 F.2d at 1472-73, 223 USPQ at 788. Thus, Applicant respectfully requests consideration of the instant application in light of the above arguments.

Please charge any additional fees or credit any overpayments associated with the filing of this correspondence to Deposit Account No. 011,056.

Please call the undersigned attorney, if there are any further questions prior to examination.

Respectfully submitted,

By:



John E. Hyatt, Reg. No. 43,421
Alzheimer & Gray
10 South Wacker Drive, Suite 4000
Chicago, Illinois 60606-7482
(312) 715-4544

Date September 29, 1999

KEY MOVER

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application is a Continuation of U.S. Patent Application Serial No. 07/990,854, filed December 11, 1992, which is a Continuation-in-Part of U.S. Patent Application Serial No. 07/913,523 filed July 14, 1992, which is abandoned and is a Continuation-in-Part of U.S. Patent Application Serial No. 07/586,957 filed September 24, 1990 which is abandoned and is a Continuation of U.S. Patent Application Serial No. 127,999 filed December 2, 1987 which issued to U.S. Patent No. 4,959,810 on September 25, 1990 which is a Continuation-in-Part of U.S. Patent Application Serial No. 109,336 filed October 14, 1987 which is abandoned.

FIELD OF THE INVENTION

10 The present invention relates to a remote control of the type which is hand held and which can be coupled via coded infrared signals with a remote control receiver built into a television or other remotely controlled electrical apparatus to turn on the apparatus, such as the television, at a distance, to adjust the volume, tone and brightness, to change channels, to turn the television off and to perform other functions, and more specifically to a remote control wherein functions can be moved or transferred to different keys or pushbuttons for the convenience of the user.

BACKGROUND OF THE INVENTION

Heretofore it has been proposed to provide a reconfigurable remote control device and programmable functions for such a remote control device which will enable one to learn, store and retransmit infrared codes that are emitted from the remote control device for a remotely controlled apparatus, such as a television.

For example, in the Welles II U.S. Patent No. 4,623,887 and the Ehlers U.S. Patent No. 4,626,848, there is disclosed a reconfigurable remote control device which has the ability to learn, store and repeat remote control codes from any other infrared transmitter. Such a reconfigurable remote control transmitter device includes an infrared receiver, a microprocessor, a non-volatile random access memory (RAM), a scratch pad random access memory, and an infrared transmitter.

According to the teachings of the Ehlers patent, the infrared signals received by the remote control device are in bursts of pulses and the device counts the number of pulses in each burst as well as the time duration of each pause in a transmission between bursts.

The Darbee et al U.S. Patent No. 4,959,810, of which this application is a Continuation-in-Part, discloses a universal remote control device having terminals for enabling code data to be supplied from outside the device through the terminals and a CPU to a RAM or ROM in the device.

Hand held remote controls of necessity have a finite number of keys and, because of the diversity of possible target devices, cannot offer a dedicated key for every possible function or feature.

Accordingly, dedicated keys are generally only provided for those functions which are common to almost all devices (e.g. Power, Volume, Channel Up/Down, etc.).

One approach to allowing a customer access to those special functions which are unique to his particular brand of remote control device (e.g. tracking or color adjustment, picture-in-picture, etc.) is to provide, in addition to the "standard" keys, a number of generic keys labeled, for example, A, B, C, D, etc. together with a booklet which lists, by brand and model, what functions are available on those keys as disclosed in the Darbee et al U.S. Patent No. 4,959,810.

The disadvantage of this method is that the number of keys is still quite limited, so the manufacturer of the universal remote control device usually has to select by brand and model which special functions are or are not offered.

Another approach is to provide a special key which, when pressed, allows a multi-key entry sequence to access any one of a large library of special functions. For example, pressing an "A" key followed by two digits (A-n-n) would provide access to up to 100 special, or "extended" functions. The disadvantage of this method is that it requires the user of the device to press the standard keys or pushbuttons multiple times in order to access any of these extended functions.

As will be described in greater detail hereinafter, the remote control device of the present invention overcomes the foregoing disadvantages by including, in the operating program for the remote control device, executable programs or routines which permit the individual user to assign any desired function to almost any key on the keypad. The user is thus able to individually customize his particular device so that his most frequently accessed functions are single keystrokes and/or in the most convenient locations on the keypad.

The executable routines or programs also allow the user to reassign keys "across devices". For example, if a user plays his TV sound through a stereo amplifier, he may wish to reassign the

"MUTE" key such that, when his remote control device is switched to TV mode, the mute signal sent in response to the button is that of the stereo amplifier, not that of the TV.

SUMMARY OF THE INVENTION

5 According to the present invention there is provided a remote control device comprising: a microprocessor including a CPU and a memory; a keypad including a set of keys coupled to the microprocessor; lamp driver circuitry coupled to the microprocessor; circuitry for generating IR signals coupled to the IR lamp driver circuitry; code data for executing command functions for a plurality of devices of different manufacturers stored in the memory; a Key Reassignment table in the memory containing key identity function data for those keys which have been reassigned by the user; and a program stored in the memory for reassigning a different function for the same or different device to a key on the keypad upon the inputting of a predetermined keystroke sequence on the keypad.

10 Further according to the present invention there is provided a method for reassigning a key function to a key on a keypad in a remote control device of the type described above comprising the steps of: entering a predetermined keystroke sequence on the keypad; determining if the predetermined keystroke sequence is a command to perform special function processing to reassign to a key a function of a device to be controlled; determining if a function key has been depressed; storing the key identity and current mode into a "FROM" entry in the Key Reassignment Table; 15
20 determining if the next key depressed is a mode key; setting the new mode; determining if a function sequence of keystrokes has been entered on the keypad for a valid function for the device and mode selected; obtaining device TYPE and command function data corresponding to the function and

mode selected from the Key Reassignment Table; and, storing the data in a "TO" entry in the Key Reassignment Table, thereby establishing a "FROM=TO" relationship between the physical key ("FROM") and the new, reassigned, function which it is to perform ("TO").

5

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a remote control device constructed according to the teachings of the present invention.

FIG. 2 is a front plan view of the control device shown in FIG. 1 and shows the various keys or pushbuttons of the device.

FIG. 3 is a block electrical schematic circuit diagram of the remote control device shown in FIGS. 1 and 2.

FIG. 4 is a flow chart of the steps performed by a key reassignment program entitled KEY MOVER: NORMAL FUNCTION.

FIG. 5 is a flow chart of the steps performed in the execution of a program for reassignment of a key function entitled KEY MOVER: KEY REASSIGNMENT.

FIG. 6 is a table showing the a Key Reassignment Table of the KEY MOVER program.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Referring now to FIG. 1 in greater detail, there is illustrated therein a remote control device constructed according to the teachings of the present invention.

20

As shown, the device 10 includes a housing 11 including an upper housing member 12 having a base panel 14, and a lower housing member 16. An overlay face panel 18 is positioned over the base panel 14 and has a keyboard layout, i.e. keypad, 20 on the outer surface thereof.

The two panels 14 and 18 have openings therethrough for receiving elastomeric pushbuttons 25, for the keypad 20, all of which extend from and are fixed to or integral with an elastomeric body panel.

The pushbuttons 25 are arranged in rows and columns and are identified as follows on the keypad 20:

VCR	AUX	CABLE	TV
A	B	C	POWER
1	2	3	MUTE
4	5	6	
7	8	9	
	0		VOL
		ENTER	
		RECALL	CH
		PAUSE	PLAY
REC	*	TV-VCR	STOP

This arrangement is shown in FIG. 2, and the manner in which these pushbuttons 25 are utilized in operating the control device 10 will be described in greater detail hereinafter.

At a top or forward end of the device 10 there is provided an opening 30 for two light emitting diodes LED 1 and LED 2. The opening 30 is covered by an infrared-transparent lens 31.

Also provided on a top surface 32 of the upper housing member 12 of the control device 10 is a light emitting diode, LED 3, by which information is communicated to the user of the device 10.

FIG. 2 is a plan view of the keyboard or keypad 20 and shows the different keys or pushbuttons 25 of the control device 10 extending through the base panel 14 of upper housing member 12 and the face panel 18 where the label or identification for each pushbutton or key 25 is shown. The light emitting diode LED 3 is also indicated.

FIG. 3 is a block electrical schematic circuit diagram of the operating circuitry 36 in the remote control device 10 which includes a microprocessor 38, including a RAM 40, a ROM 42 and a CPU 44. The keypad 20 is coupled to the microprocessor 38 by an interrupt line 46 and a bus 48 to the CPU 44.

A power supply in the form of a battery 50 is connected between a + voltage input 51 to the microprocessor 38 and a system ground 52. A backup battery 56 is connected through a diode 58 to the + voltage input 51 to maintain the data stored in the memory 42 and/or 44 to provide a non-volatile system.

A reset circuit 60 is coupled to the microprocessor 38, as shown.

An output of the CPU 44 is connected to an IR lamp driver circuit 62 which outputs a voltage to the two light emitting diodes LED 1 and LED 2.

The status indicating LED 3 is connected to an input of the microprocessor 38.

The electrical circuitry 36 is generally of the type disclosed in greater detail in the Darbee et al U.S. Patent No. 4,959,810, the disclosure of which is incorporated herein by reference.

The operating program for the remote control device 10 which is stored in the ROM 42 or RAM 40 is very similar to the operating programs disclosed in the Darbee et al U.S. Patent No.

4,959,810, incorporated herein by reference, with the exception of the KEY MOVER routine or program described below, for moving or assigning a selected function to a selected key.

With reference to FIG. 4, in the normal operation of the KEY MOVER program, whenever a key is struck, the program determines whether or not it was the mode key and if it was then the mode of operation is changed.

If it was not, the program then determines whether it was the "A" key. If it was, a "Shift" status is set, enabling the program to "remember" during subsequent key presses that the "A" key had been struck.

If the answer is "No", the program then determines if the "B" key has been struck and the "Shift" status is in effect, and if the answer is "Yes", the program enters the special function processing mode for reassigning a key which is described in greater detail below and in connection with the description of FIG. 5.

This special function processing in the reassign mode of operation of the remote control device 10 allows the operator to reassign FUNCTION keys by typing on the keypad 20:

A-B-C-9-9-9 <From Func> <To Func>.

Thus, one can customize his/her keyboard or keypad 20.

If the user wants keys from a different mode (device) to replace existing keys, that can be done by typing on the keypad 20:

[From Mode] A-B-C-9-9-9 <From Func> [To Mode] <To Func>.

For example, if one wants Volume Up (VL+) from a CD to replace Volume Up for a TV, the user will type on the keypad 20:

TV A-B-C-9-9-9 VL+ CD VL+

Now, whenever the user is in the TV mode, pressing Volume Up will raise the volume on the CD player, not the TV. One can also make it so that the TV volume operates normally, but pressing keys:

A VL+

5 will operate the CD volume.

This is accomplished by typing on the keypad 20:

TV A-B-C-9-9-9 A VL+ CD VL+

A very desirable feature of the KEY MOVER program is that it allows one ready access to "extended" functions that would otherwise require several keystrokes. For example, if the remote control device 10 is of the type disclosed in U.S. Patent Application Serial No. 07/913,523 entitled: REMOTE CONTROL DEVICE WITH FUNCTION SYNTHESIS and where, to effect Color Up, one has to type on the keypad 20:

A-6-3-8,

one can move that function to the Channel Up key by typing:

TV A-B-C-9-9-9 A CH+ A-6-3-8.

Now, pressing CH+ will change channels on the TV normally, but pressing A CH+ will send Color Up.

One can assign alternate functions to any key except the mode (device) keys or the "A" key.

Returning to the program, if the pressing of the "B" key and setting of the "Shift" status have not occurred, the program then determines whether a DIGIT (number) key has been depressed and whether the "Shift" status is in effect.

If the answer is "Yes", extended function processing is performed such as synthesizing of an alternate or extended function in the manner described in U.S. Patent Application Serial No. 07/913,523 entitled: REMOTE CONTROL DEVICE WITH FUNCTION SYNTHESIS, the disclosure of which is incorporated herein by reference.

5 If the answer was "No" to the question of whether a DIGIT (number) key has been struck and "Shift" status is in effect, the program scans the "FROM" entries in a Key Reassignment Table for a match on key number, "Shift" status and mode. Then, a determination is made to see if a match has been found. If a match is found, then the device data format and command = data from the corresponding "TO" entry in the Key Reassignment Table is sent to the IR lamp driver circuit 62 and the IR code is transmitted based on that device data format and command data settings.

 If no match was found, then the current mode's standard data for that key number and device data format is sent to the IR lamp driver circuit 62 to cause the IR code to be transmitted on the standard device ID and command data setting.

 After the IR code is transmitted, as well as after the performance of the special function and the extended function (synthesis), the "Shift" status is cleared.

 Stated in a simplified way, whenever a key is struck, the KEY MOVER routine or program illustrated in FIG. 4, after checking for the striking of special keys or functions, begins by scanning a special table, the Key Reassignment Table, in memory. This table is for all keys which have been reassigned. If a match is found, the program extracts from the second part of the table entry the
20 device data format and command information to be sent in lieu of the standard assigned function for that key and mode.

 If no match is found, the standard device data format and command data are used.

The special KEY MOVER function program, protocol or subroutine is illustrated in FIG. 5 and starts with the detection of a key sequence, such as A-B-C-9-9-9.

Then, it is determined whether the next key pressed was "A".

If "Yes", then the "Shift" bit is set in the Key Reassignment Table and the program waits for the depression of another key.

Next, the program determines if a function key has been depressed. If "No", the program goes to exit.

If "Yes", the key number and current mode are stored into a "FROM" entry in the Key Reassignment Table (FIG. 6) and the program waits for the next key.

Next, a determination is made whether a mode key has been depressed. If "Yes", the new mode is set and the program waits for the next key stroke.

After that, or if the answer was "No", a determination is made if one or more keys have been depressed for a valid function sequence. If "No", the program exits.

If "Yes", the program obtains a device data format and command data corresponding to the function and mode selected and stores this data into a "TO" entry in the Key Reassignment Table which is illustrated in FIG. 6.

Whenever a special key sequence "A-B-C-9-9-9" is used, the operating program for the remote control device switches to the special function processing, KEY MOVER, program illustrated in FIG. 5, i.e. the "KEY MOVER" program as explained above and as indicated in the special function processing step of FIG. 4 and as further described in connection with the description of the flow chart in FIG. 5.

If a complete definition of the device data format requires more space than is provided for in the Key Reassignment Table shown in FIG. 6, the initial table entry under "DEVICE TYPE" simply may be a pointer to a secondary table, DEVICE DATA TABLE, containing additional information, as shown in FIG. 6.

5 From the foregoing description, it will be apparent that the KEY MOVER program of the present invention provides a number of advantages some of which have been described above and others of which are inherent in the invention. In particular, a dedicated or universal remote control device having the KEY MOVER program therein enables the user of the device to customize his particular device so that his most frequently accessed functions are single key strokes and/or in the most convenient location on the keypad 20. Also, the method of the present of the present invention, the Key Mover program, and operating keys (A-B-C-9-9-9) can be modified without departing from the teachings of the present invention. Accordingly, the scope of the invention is only to be limited as necessitated by the accompanying claims.

CLAIMS

What is claimed is:

1. A remote control comprising:

a memory;

a plurality of function instructions stored in the memory, including a first function instruction and a second function instruction;

a plurality of keys including a first key operably connected to execute the first function instruction; and

reassignment means for operably connecting the first key to execute the second function instruction instead of the first function.

2. A remote control comprising:

a memory;

a plurality of functions including a first function;

a plurality of keys including a first key and a user selected key, wherein the first key is connected to operate the first function; and

reassignment means including a Key Moving program in the memory for moving operation of the first function to the user selected key from the first key.

3. A remote control comprising:

a micro processor including a CPU and memory;

a plurality of executable programs stored in the memory, including a first executable program and a second executable program;

5 a plurality of keys including at least one key operably connected to execute the first executable program; and

reassignment means for reassigning the at least one key to be operably connected to execute the second executable program instead of the first executable program.

10 4. The remote control of claim 3, wherein the reassignment means comprises a Key Reassignment table in the memory, and wherein the Key Reassignment table contains key identity function data for keys which have been reassigned by a user.

15 5. The remote control of claim 3, wherein the reassignment means comprises a program stored in the memory for reassigning a different function to the at least one key upon inputting a predetermined keystroke sequence.

6. A remote control device comprising:

a microprocessor including a CPU and memory;

a keypad including a set of keys coupled to the microprocessor;

lamp driver circuitry coupled to the microprocessor;

means for generating IR signals coupled to the IR lamp driver circuitry;

instructions and data in binary form stored in the memory for enabling command functions for controlling a plurality of devices manufactured by different manufacturers, wherein the instructions and data are to be retrieved and supplied to the means for generating IR signals;

reassignment means for reassigning the instructions and data stored in memory associated with the command functions, wherein the reassignment means includes;

program instructions in binary form stored in the memory for enabling one to assign one of the command functions to a key on the keypad upon the inputting of a keystroke sequence on the keypad, wherein the instructions and data stored in memory associated with the one of the command functions is associated with the key.

7. The remote control device of claim 6 wherein the keypad includes device keys, mode keys and alpha-numeric keys.

8. The remote control device of claim 6 wherein the Key Reassignment Table includes, for each key, key identity mode data, device data format, and command function data.

9. A remote control device comprising:

a microprocessor including a CPU and memory;

means for generating IR signals defining IR command functions coupled to the microprocessor;

5 instructions and data in binary form stored in the memory for enabling IR command functions for controlling a plurality of devices manufactured by different manufacturers, wherein the instructions and data are to be retrieved and supplied to the means for generating IR signals;

code data for executing IR command functions stored in the memory; and

reassignment means for reassigning instructions and data associated with a key to another key, wherein the reassignment means includes program instructions in binary form stored in the memory for assigning a command function to a key selected by a user.

ABSTRACT

The invention teaches remote control device for reassigning functions associated with one key to another key, wherein the functions are stored in memory. In one embodiment the remote control comprises a memory and a plurality of function instructions stored in the memory, including a first function instruction and a second function instruction. A plurality of keys, including a first key, is operably connected to execute the first function instruction. Reassignment programming is stored in memory and provides for connecting the first key such that it will execute the second function instruction instead of the first function.

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FIG.1

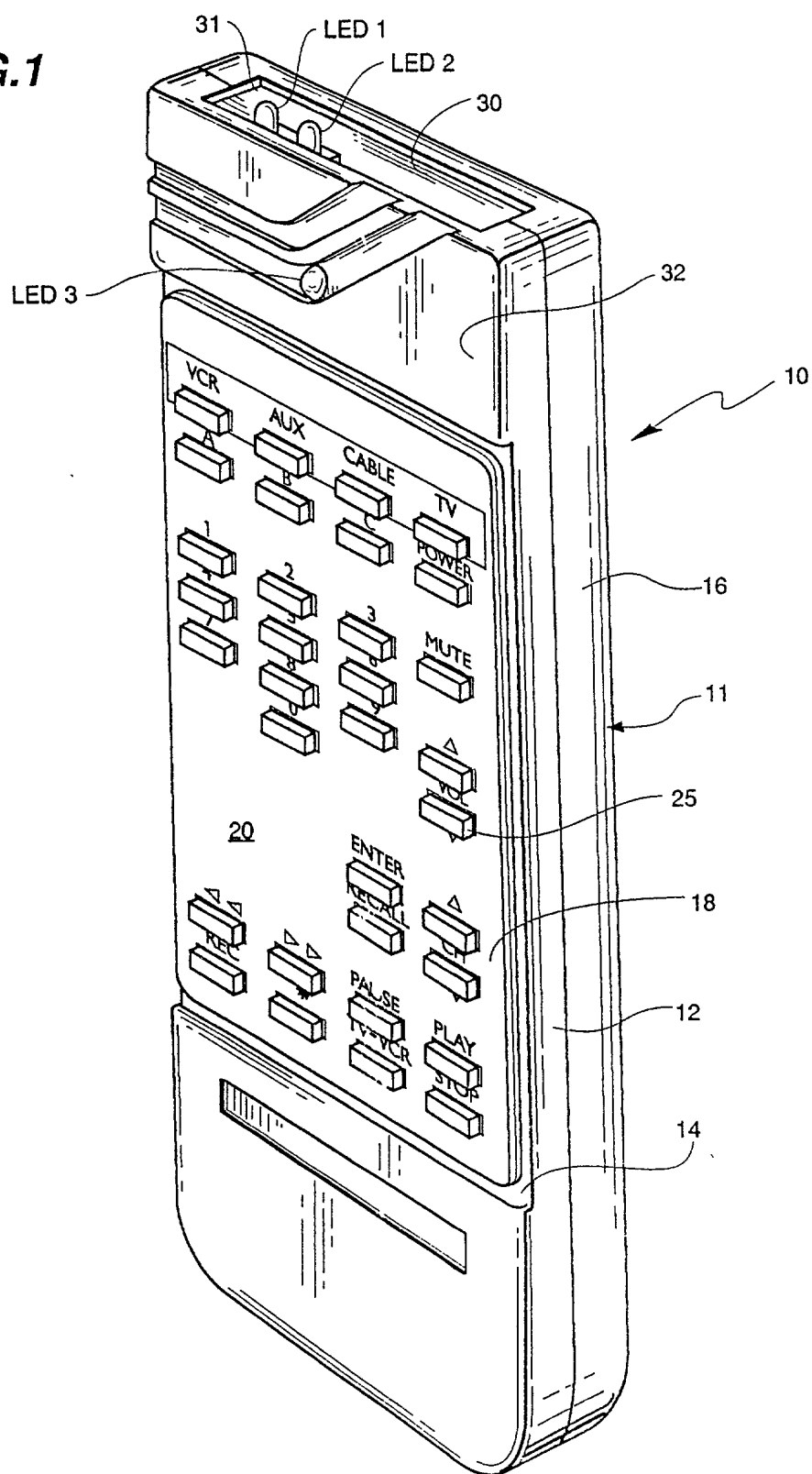


FIG.2

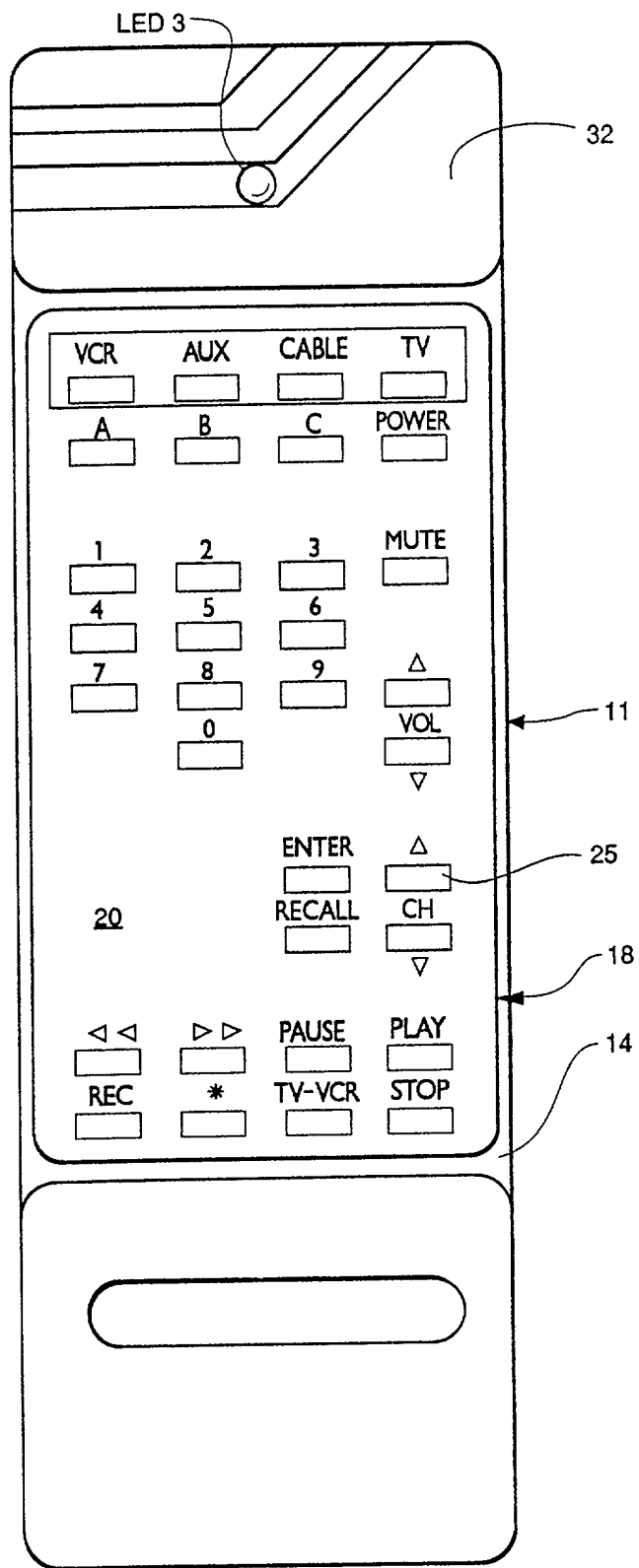


FIG. 3

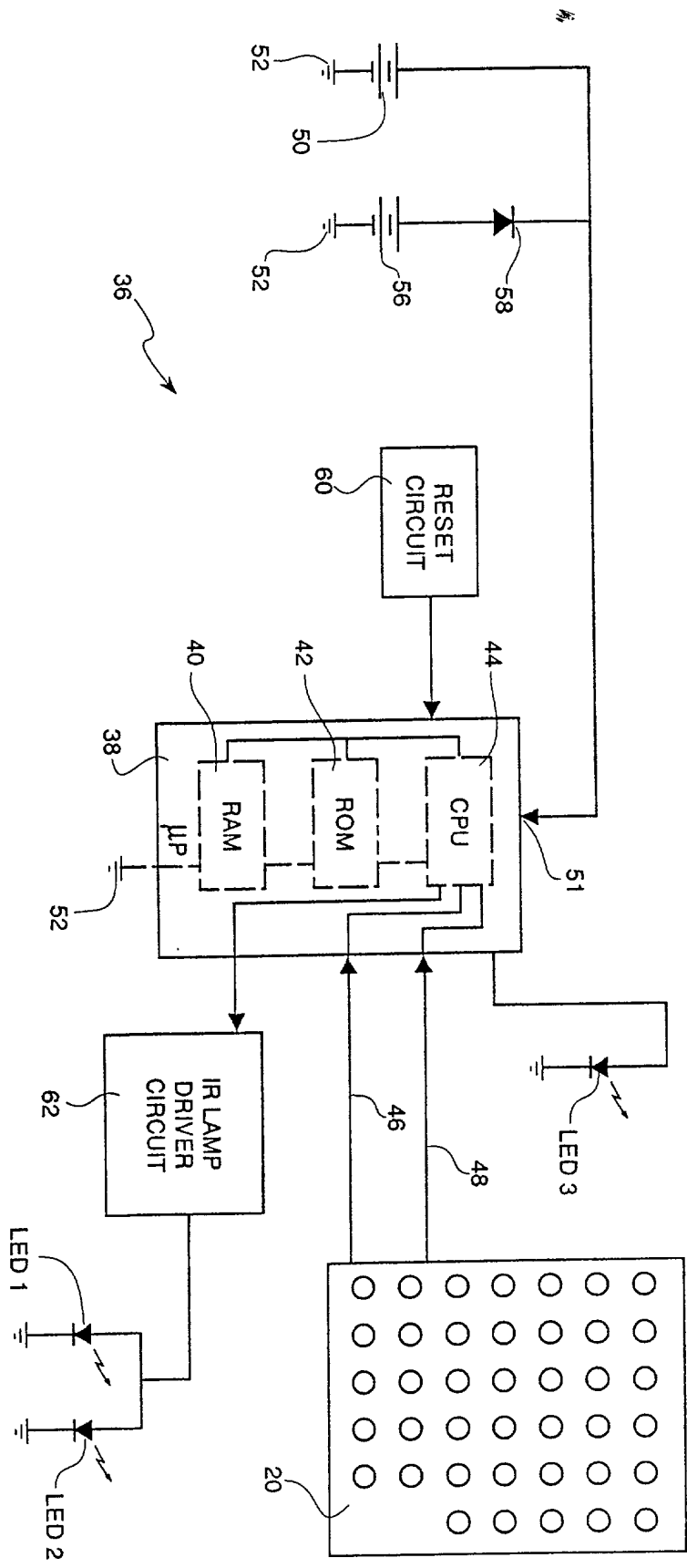


FIG. 4

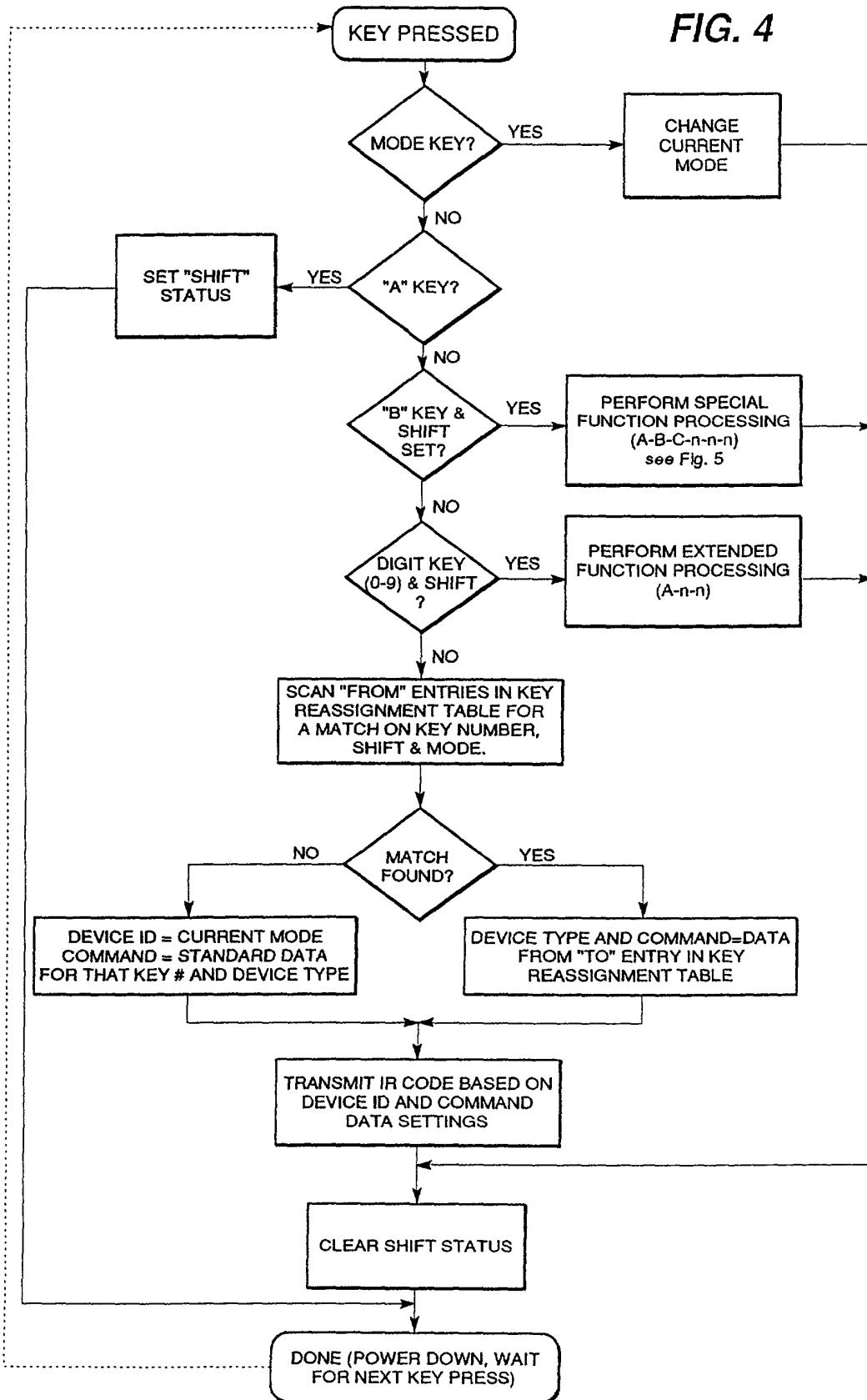
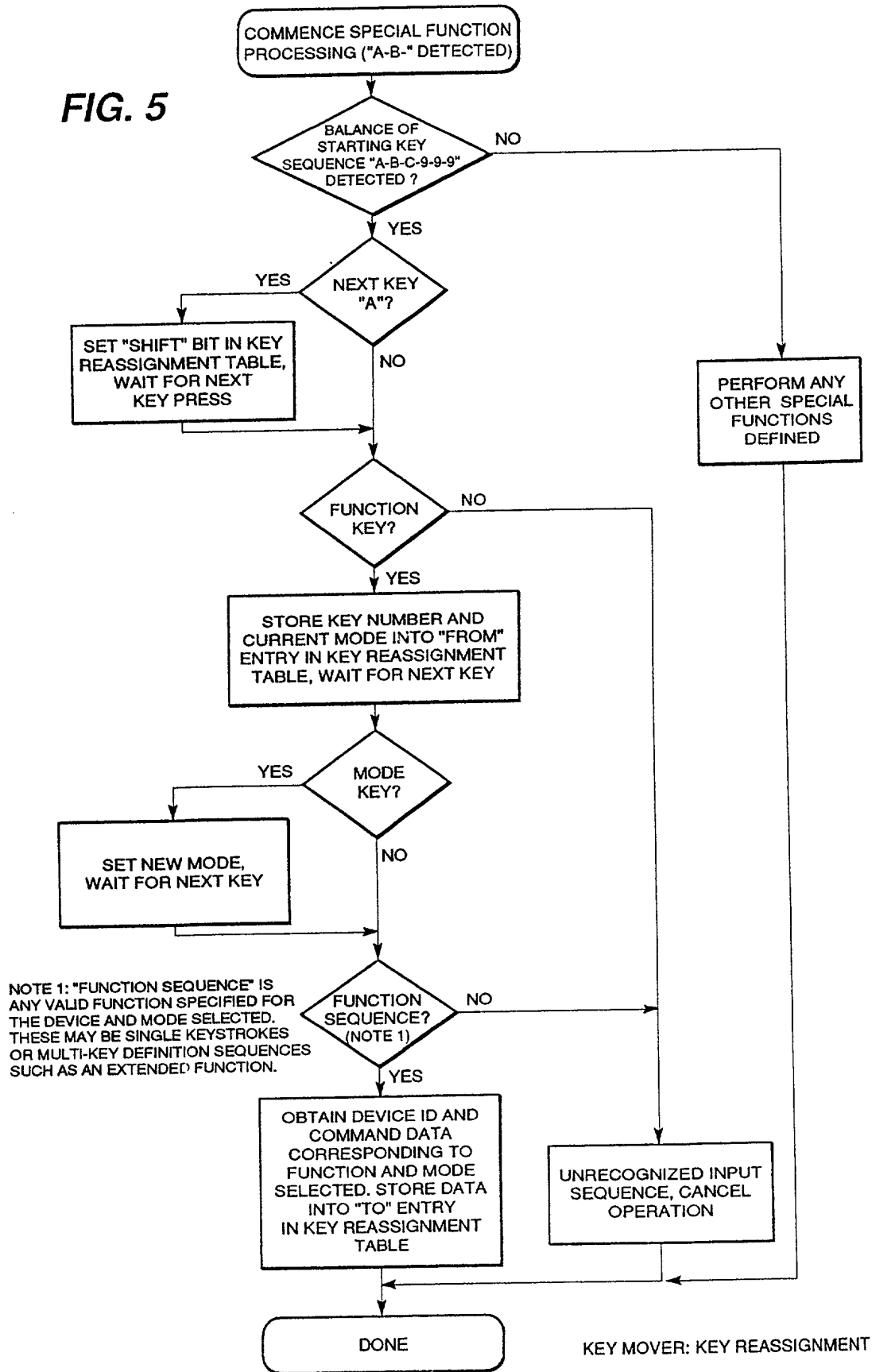
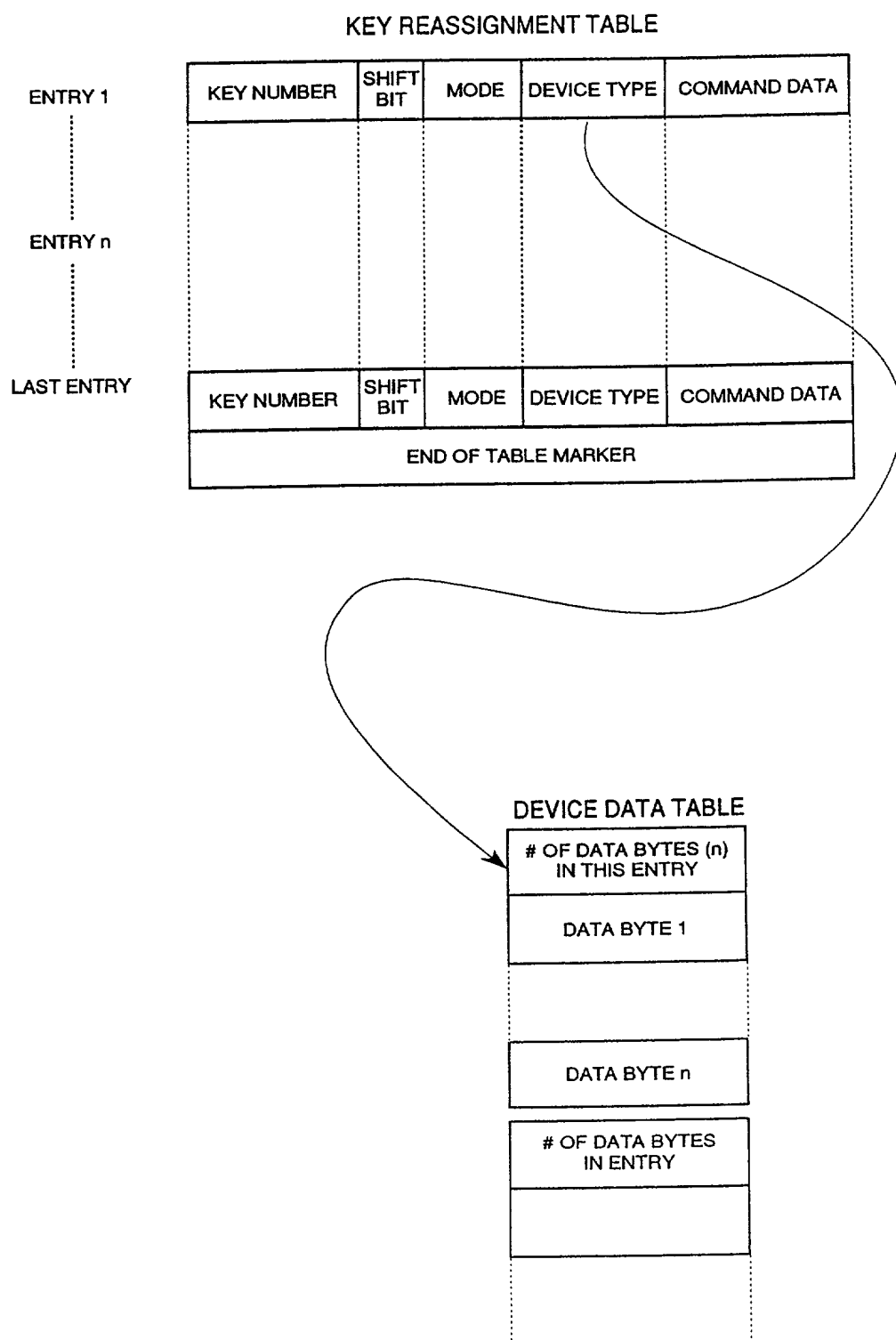
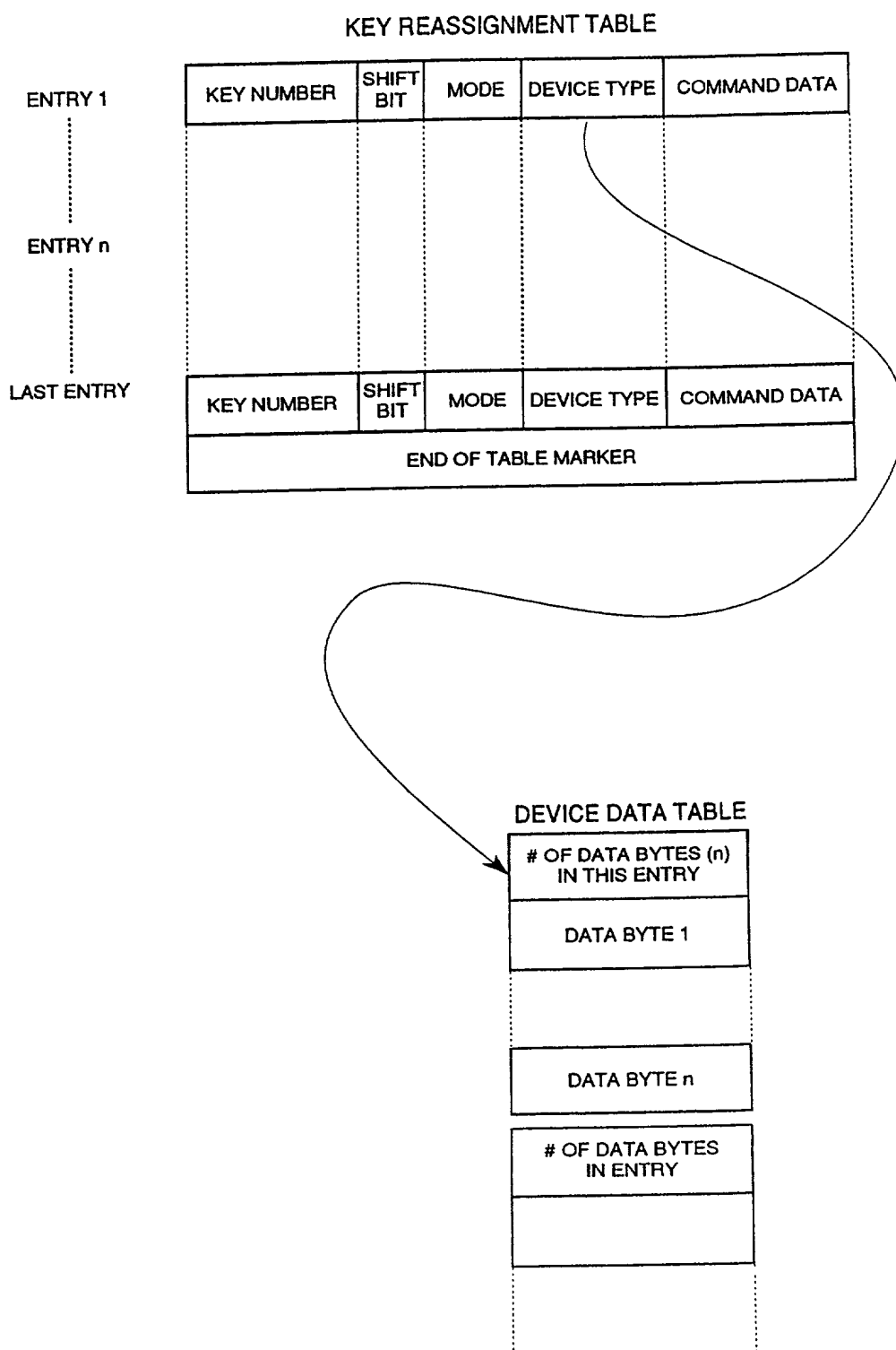


FIG. 5



[illegible]

[illegible]

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

KEY MOVER

the specification of which (check only one item below):

- ☐ is attached hereto.
- ☒ was filed as United States application

Serial No. 07/990,854

on December 11, 1992

and was amended

on (if applicable)

- ☐ was filed as PCT international application

Number

on

and was amended under PCT Article 19

on (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby authorize the U.S. attorney or agent named herein to accept and follow instructions from

as to any action taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119	
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration For Patent Application and Power of Attorney (Continued)

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
07/913,523	July 14, 1992		X	
07/586,957	September 24, 1990		X	
127,999	December 2, 1987	X		
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NUMBER	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Thomas R. Vigil, Reg. No. 24,542
Gary J. Cunningham, Reg. No. 33,488

James P. Hanrath, Reg. No. 31,965
Charles W. Ryan, Reg. No. 28,110

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(708) 382-6500

201	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
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		Santa Ana	California	U.S.A.
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	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
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	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
		Luo	Qiuju	-----
		Orange	California	China
		8440 E. Hillsdale Dr.	Orange	CA 92669

I hereby declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201

SIGNATURE OF INVENTOR 202

SIGNATURE OF INVENTOR 203

DATE

DATE

DATE

12-14-92

12-14-92

12-14-92

Combined Declaration For Patent Application and Power of Attorney (Continued)

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032 (continued)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
109,336	October 14, 1987			X
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NUMBER	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Thomas R. Vigil, Reg. No. 24,542
Gary J. Cunningham, Reg. No. 33,488

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FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	Nguyen	Kimthoa	T.
RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	Yorba Linda	California	U.S.A.
STATE & ZIP CODE/COUNTRY			

CALIFORNIA

STATE OF CALIFORNIA)
COUNTY OF ORANGE) ss.

On December 14, 1992, before me the undersigned, a Notary Public for the State of California, personally appeared Paul Darbee, Quiju Luu, Kimthoa Nguyen, Donald Gene Supercio proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument, and acknowledged that he executed it.

WITNESS my hand and official seal.

Diane L Marcroft
Notary Public

